In re Patent Application of:
LANGE ET AL.
Serial No. **09/812,236**
Filing Date: **03/19/01**
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REMARKS

Claims 1-28 and 42-45 remain in this application. Claims 29-41 have been cancelled. Claims 1, 11 and 42 have been amended.

Applicants thank the Examiner for the detailed study of the application and prior art. At the outset, Applicants have amended claim 11 to recite that the transceiver is operatively connected to each optical transmitter, and deleted the recitation regarding the matched optical receiver. This transceiver receives and transmits an optical communications signal and is operative at a first wavelength band, while the optical transmitter is operative at the second wavelength band.

Claim 1 has also been amended to recite that the optical transmitters in the first claim element recitation receive signals that had been electrically processed at a first wavelength band and transmit optical communications signals along respective signal paths at a second wavelength band. A wavelength division multiplexer is operatively connected to each optical transmitter and receives the optical communications signals and wavelength division multiplexes the optical communications signals within the second wavelength

band into multimode wavelength division multiplexed optical communications signals. A demultiplexer receives the multimode wavelength division multiplexed optical communications signal within the second wavelength band and demultiplexes the signal into a plurality of demultiplexed optical communications signals. Optical receivers are each connected to the multiplexer and matched with each respective optical transmitter and receive and detect the demultiplexed optical communications signal and generate a signal to be output as an optical communications signal contained within the first wavelength band.

The present claimed invention is advantageous because it allows the bandwidth of an existing optical communications network to be expanded. It can be built on existing networks, such as using Ethernet components and existing fiber infrastructure. The present invention is extensible to higher channel counts and higher data rates to achieve higher aggregate information capacity.

Applicants appreciate the allowance of independent claim 17 and its dependent claims 18-28.

Applicants note the rejection of claims 1-2, 5 and 42-43 as anticipated by U.S. Patent No. 6,404,522 to Handelman. Other dependent claims were rejected as obvious

over Handelman in view of one of U.S. Patent No. 6,496,261 to Wilshire et al. (hereinafter "Wilshire"); U.S. Patent No. 4,415,803 to Muoi; U.S. Patent No. 6,151,144 to Knox; U.S. Patent No. 4,930,855 to Clark et al. (hereinafter "Clark"); U.S. Patent No. 5,799,289 to Taga et al. (hereinafter "Taga"); and further in view of U.S. Patent No. 6,607,311 to Fishman et al. (hereinafter "Fishman"); U.S. Patent No. 4,932,004 to Hodara et al. (hereinafter "Hodara"); and further in view of U.S. Patent No. 6,577,605 to Dagate et al. (hereinafter "Dagate").

As to the primary reference to Handelman, Applicants note that it is directed to improving communications in an optical communications system that communicates data via N different channel wavelengths using wavelength division multiplexing. When the system determines that the N channel wavelengths are not all carrying data simultaneously, a switching unit routes data signals to selected channel wavelengths that are selected to increase channel spacing between as many possible channels. Channel hopping can also be performed when time dependent changes occur, such as through temperature changes. It is also possible to reduce data carried over any interfered channels by lowering the actual capacity of at least some of the N channels through

channel condensation. Channels can be combined at a bandwidth between 1.52 micrometer and 1.62 micrometer with a channel operating at 1.31 micrometers.

Applicants agree that Handelman discloses some use of optical transmitters, multiplexers, demultiplexers, and optical receivers, with a limited wavelength channel spacing.

Handelman nowhere discloses or suggests, however, the present claimed invention in which optical transmitters receive electrically processed signals of a first wavelength band, such as from a transceiver, and transmit optical communication signals along respective signal paths at the second wavelength band. Through the use of the wavelength division multiplexer and demultiplexer that operate at the second wavelength band, and the plurality of optical receivers that are connected to the multiplexer and each respective optical transmitter, these signals are received and detected and a signal generated to be output as an optical communications signal contained within the first wavelength band. This entire unit is operative as a multimode wavelength division multiplexing (WDM) network transceiver that can be adapted to many different network infrastructures, including an Ethernet infrastructure as set forth in the detailed description of the instant application.

At most, Handelman suggests multiplexing and demultiplexing optical signals for carrying them on different channels, but nowhere suggests the use of a first wavelength band and second wavelength band, as in the present claimed invention.

Although Wilshire may show the use of InGaAS PIN detectors, Wilshire is directed to testing integrated circuits and the optical interferometric probing of integrated circuit electrical activity. In Wilshire, a repetitive electrical test pattern signal is applied to devices. It nowhere suggests using an optical receiver as an InGaAS PIN detector, as in the present claimed invention.

Muoi is particularly directed to an optical receiver with an improved dynamic range and an optical detector serially connected to a transimpedance amplifier that supplies a fixed amount of gain along with the current-to-voltage conversion. Muoi improves the dynamic range for an optical receiver, but does not suggest the use of a transimpedance amplifier as in the present claimed invention.

Knox discloses a passive optical network system with multiple access providers to produce high capacity information conduits that reach residential customer premises for broadband transmission. The distributed feedback lasers in

Knox transmit at different wavelengths that are passed through multiple channel filter devices as part of a distribution system. Although Knox may disclose the use of some distributed feedback lasers, their use is much different from their use in the present claimed invention in which the optical transmitter comprises a distributed feedback laser and receives the signal from a transceiver that is operative at a second wavelength band different from the first wavelength band.

Clark is directed to multiplexing or demultiplexing multiple laser beams of different wavelengths to increase efficiency of laser communication and make filtering technology more efficient in wavelength multiplexing. Clark nowhere suggests that the optical transmitter of the present invention could be a thermal electric cooler and controller circuit. Clark suggests that the difference between the sampled voltage and a reference can be used as an error signal to adjust current through a thermoelectric cooler to control the temperature of a diode laser.

Taga discloses a wavelength division multiplexed (WDM) optical communication method and apparatus that uses pre-emphasis to adjust attenuation or amplification of an optical channel at a transmitter terminal to produce identical

signal-to-noise ratios for all optical channels at a receiver terminal. These pre-emphasis adjustments are made on the basis of signal-to-noise ratio measurements performed at the receiver terminal. The attenuator in Taga is used with a pre-emphasis circuit and does not suggest that an attenuator can be positioned within a transmit signal channel between each optical transmitter and a multiplexer.

Hodara is specifically directed to a fiber optic seismic system with a distributed geophone acquisition system having cables and twisted pairs of electrical conductor channels and fiber optic-like guides. Multiple geophone take-outs are connected to separate channels of the cables and remote data units connect between adjacent ends of each data cable and convert the geophone signals to light signals. Hodara shows a data chip 52 as part of a downlink RDUS. The Hodara data chip allows Manchester to NRZ conversion. It does not suggest a chip circuit as a physical layer chip circuit of the present invention, connected in combination of the optical transmitters and matched optical receivers as in the present claimed invention.

Fishman discloses multi-line optical sources with a multichannel WDM optical network, while Dagate shows the use of RJ-45 jacks for automatic call distributors (ACD's) that

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connect to Ethernet 10baseT ports. Although RJ-45 jacks are disclosed, Dagate never teaches the use of RJ-45 jacks for Ethernet 1000baseT connections of an electrical interface for a transceiver of the present claimed invention.

Applicants contend that the amended independent claims 1 and 42 are now allowable over the cited prior art. Applicants contend that the cited prior art neither singularly nor in combination disclose or suggest the present claimed invention as now set forth in the amended claims.

Applicants contend that the present case is in condition for allowance and respectfully requests that the Examiner issue a Notice of Allowance and Issue Fee Due.

If the Examiner has any questions or suggestions for placing this case in condition for allowance, the undersigned attorney would appreciate a telephone call.

Respectfully submitted,

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Julie Lalan